

Historic, Archive Document

Do not assume content reflects current scientific knowledge, policies, or practices.

Issued October 1932
Revised September 1934

THE GLADIOLUS THRIPS

By C. A. Weigel, Division of Truck Crop and Garden Insects,

Bureau of Entomology and Plant Quarantine, ★

U. S. Department of Agriculture

LIBRARY

RECEIVED

★ JUN 23 1935 ★

U. S. Department of Agriculture

The gladiolus thrips is a very small, slender insect measuring about one-sixteenth of an inch in length. This thrips feeds on the corms, leaves, buds, and flowers of the gladiolus. It has four stages of development, namely, the adult, egg, larva, and pupa. Only the adult and larval stages cause injury to the plants. Several species of thrips may feed on gladiolus at the same time, but the gladiolus thrips is always the most injurious and is distinguishable from the other thrips by a cream-colored band which crosses the middle of the black or dark-brown body. The larva and pupa are lemon yellow and are found mostly in the leaf sheath or the buds. The insect develops from eggs deposited in the plant tissue by the adult female, and the eggs are not visible. Only from 11 to 13 days are required in mid-summer for development of the insect from egg to adult.

Injury

Injury to the corms.—This thrips feeds on the corms while in storage, causing a russetting of the areas fed upon. It may also feed on the base of the corms and kill the young rootlets. When the corms are severely injured by the thrips, the growth is retarded and inferior flowers are produced.

Injury to the growing plants.—After the corm is planted, the thrips follow the sprout of the corm to the surface and there feed and reproduce throughout the season on the foliage and flowers. The infested leaf sheaths become brown, the leaves become "silvered," and the bud sheaths dry out and appear straw colored. The feeding also injures the petals while still in the bud stage, preventing the normal opening of the flowers. The loss of color from attack of the pest is manifested by whitish streaks in the petals. This discoloration is especially noticeable in the dark-colored varieties. In severe cases the spikes never show color, but turn brown and appear "blighted."

For the most part the thrips secrete themselves in the leaf sheath, but under favorable conditions, such as cloudy days, in the early morning, or late in the afternoon, they may be seen on the surface of the leaves. For this reason the insects are not usually observed until the flowers show damage or unless careful examination is made of the plants.

The habits of this thrips are remarkably suited to the method of growing gladiolus, for it is carried into storage at harvest, feeds on the corms during the winter, and is returned to the field when infested corms

are planted. Control should therefore consist of (1) preventing the thrips, as far as possible, from reaching the winter storage stocks, and (2) combating it on the stored corms.

Prevention and Control

At harvest time, reduce corm infestation by cutting off the tops, but avoid shaking the thrips over the corms in the process; then remove the corms from the field as soon as possible after digging. The tops should be destroyed, by burning if possible, to prevent the thrips from reaching any unharvested part of the crop. The gladiolus thrips does not overwinter out of doors in the Northern States but overwinters on the stored corms only. Gladiolus can be planted back in the same field the next season, after an effective corm treatment has been applied, and will not be troubled with the thrips the second year unless reinfested from untreated corms growing in adjacent gardens. The importance of planting only thrips-free corms is self-evident.

Store the corms for at least a month at a low temperature, preferably between 35° and 40° F., wherever practicable, although temperatures below 32° F. should be avoided. By this time the corms will have cured enough to withstand treatment, although this should preferably be delayed until cold weather, especially if there is a possibility that the thrips can gain access to the corms from growing plants on the outside. As a further precautionary measure, destroy all discarded corms and other refuse removed from the stock during the cleaning process.

Corm Treatment During Winter

Naphthalene flakes.--This material is readily available, cheap, and effective, and it is safe, both to the user and to the corms, even when an overdosage is accidentally employed. The flakes should be used at the rate of 1 ounce (4 level tablespoons) for every 100 corms, or 1 pound for 2,000 corms.

For small lots, place the corms in tight paper bags and scatter the flakes over them, then fold over and fasten tightly the tops of the bags to retain the fumes.

In treating large lots, sprinkle the flakes over and among the corms in the tray, and then cover with a light canvas or wrapping paper. The average commercial grower will find it convenient to apply the flakes to the corms directly after they have been cleaned, thereby saving extra labor in handling.

The naphthalene should remain with the corms for about 4 weeks, after which time the excess flakes should be shaken out. However, if the treatment is applied during the late fall and early winter the flakes may be left with the corms for two months or longer without harm.

The treatment may be used at any time during the winter, preferably between November 1 and March 1, but its use late in the spring should be avoided, as it will retard the subsequent growth.

Do not use a covered tin can or other equally tight container, because the corms are likely to "sweat" and sprout during the treatment.

Other fumigants.--Fumigation with calcium cyanide or a mixture of ethylene dichloride and carbon tetrachloride is also effective. These materials, however, are preferable only for growers with storage houses of tight construction or with fumigation chambers especially built for such purposes. Further details regarding their use will be furnished on request. Calcium cyanide is a deadly poison.

Corm Treatment at Planting Time

The use of naphthalene flakes during the winter is preferable whenever practicable, but under certain conditions growers may find it necessary to treat their stocks just prior to planting, especially when new stocks are being acquired or if an infestation is not discovered until that time. Under these conditions the corms may be treated with mercuric chloride, semesan, or hot water.

Mercuric chloride.--Mercuric chloride (corrosive sublimate), when used as a solution containing 1 ounce to 8 gallons (1 to 1,000), kills all thrips on unpeeled corms left in the dip for 12 to 17 hours. Since mercuric chloride dissolves very slowly in cold water, it is advisable to first dissolve it in a small quantity of hot water, then dilute to the correct amount with cold water. Make up a fresh solution for each new batch of corms.

Semesan.--Semesan (containing 30 percent of hydroxymercurichlorophenol), used at a 2-percent concentration (1-1/2 pounds to 10 gallons), with an immersion period of 7 hours, gives a complete kill of all stages of the insect. The directions for preparing this material, as given on the container, should be followed.

Both mercuric chloride and semesan are deadly poisons, and the greatest precautions should be taken in handling them. The use of rubber gloves may be desirable. Since mercuric chloride is corrosive to metals, it should be mixed and used only in glass, earthenware, or wooden vessels.

Hot water.--Immersion of small lots of corms in hot water at 112° F. for 20 minutes, or of bushel lots for 30 minutes, kills all stages of the thrips. This method is useful for killing the thrips in a short time, particularly for the grower who wishes to plant immediately after receiving a shipment.

The type of hot water vats used in the treatment of narcissus bulbs are suitable for treating commercial quantities of gladiolus corms. However, the ordinary home utensils may be used for very small lots of corms.

A large vessel is filled with water heated to the desired temperature. The corms in cloth bags are immersed and the vessel is covered. The water should be stirred frequently, and, if steam is not available, additional hot water should be added to keep the temperature at the correct point. A thermometer of good grade should be suspended in the water, and the temperature should be watched closely during the treatment. Accuracy in the timing of the exposure is important.

It should be remembered that corm treatment, whether naphthalene flakes or other materials are used, does not prevent later reinfestation. It is very essential to isolate untreated corms from treated stock and to avoid carrying thrips from one to the other on clothing, tools, or containers. The refuse from cleaning should be destroyed, and all new stock should be treated before it is stored with any corms that have been disinfected.

Control of Thrips in the Field

If all corms planted have been effectively treated by one of the foregoing methods, the resulting plants should be free of thrips. However, infestations may inadvertently come in from a neighboring untreated planting, for example, so that it is well to watch plants closely, so that spraying may be started immediately if an infestation appears.

Since the thrips are difficult to find on the foliage, a careful examination of the plants should be made as soon as they are up 5 or 6 inches, and if any "silvered" spots are noticed, the plants should be sprayed. Careful spraying, repeated weekly or every 10 days until flowering begins, will do much toward insuring a normal crop of flowers. This can only be accomplished by destroying the insects before they have an opportunity to enter the buds.

Two of the most effective sprays that have been tested in the fields are made up as follows:

<u>Formula no. 1</u>	<u>Small quantity</u>	<u>Large quantity</u>
Paris green	1 ounce (about 1 rounded tablespoonful)	2 pounds
Brown sugar	2 pounds	66 pounds
Water	3 gallons	100 gallons
 <u>Formula no. 2</u>	 <u>Small quantity</u>	 <u>Large quantity</u>
Paris green	0.4 ounce (about 1 rounded teaspoonful)	13 ounces
Molasses	3/4 pint (1-1/2 cups)	3 gallons
Water	3 gallons	100 gallons

The very dark grade of molasses should not be used, as it will leave an objectionable deposit on the plants.

To obtain the best results it is necessary to use a sprayer capable of sufficient pressure to produce a fine mist spray that will cover all leaf surfaces of the plants with tiny droplets. Do not apply so much spray that

these droplets will unite and run off. It is necessary to keep the spray mixture well stirred or agitated during the application. If rain occurs within 12 to 24 hours after the application, the spray should be repeated.

Some of the lower leaves will be burned by either of the above sprays and appear brown, but the flowers should be uninjured and of good quality. This foliage injury is apparently not detrimental, since the remaining foliage will be normal, except in such areas where extensive thrips feeding has occurred.

If the spraying has been started early and while the plants are small, the infestation should be so greatly reduced that no further treatments need to be made after the appearance of the first flowers. However, the last spray application should be so timed that it will be made as close to the beginning of the flowering period as possible.

If it is necessary to continue the spraying during the flowering period, all spikes showing color should be cut before each application.

If spraying for any reason has been delayed until the flower spikes appear, little can be done to save the flowers. In such cases, in order to reduce the number of thrips present and to avoid their possible migration to nearby younger plantings, it is advisable to cut and burn all infested flower spikes wherever practicable.

It is also advisable to plant the early, midseason, and late flowering varieties in separate groups, as this aids in controlling the thrips.

